Professional Course (Odd) Examination, 2022

(3rd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Course No. : BCA/3/CC/13

(Operating Systems)

(Revised)

Full Marks : 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

(PART : A—OBJECTIVE)

(*Marks* : 25)

SECTION—I

(*Marks* : 15)

A. Choose and write the correct answer : 1×10=10

1. Which one is an example of real-time operating system?
   (a) Air traffic control
   (b) Salary sheet
   (c) Supercomputer
   (d) Excel

2. Which one of the following is ***not*** an example of operating system for computer?

   (a) Windows 11

   (b) Mac OS

   (c) Chrome OS

   (d) Android OS

3. The number of processes that are completed per time unit is known as

   (a) throughput

   (b) turnaround time

   (c) waiting time

   (d) response time

4. Pre-emptive scheduling is the strategy of temporarily suspending a running process

   (a) when it request I/O

   (b) to allow starving process to run

   (c) before the CPU time slice expires

   (d) None of the above

5. In which of the following at least one resource must be held in a non-sharable mode?

   (a) Hold and wait

   (b) Mutual exclusion

   (c) No preemption

   (d) Circular wait

6. Which one of the following is correct to eliminate deadlock using resource preemption?

   (a) Selecting a victim

   (b) Rollback

   (c) Starvation

   (d) All of the above

7. A page fault occurs

   (a) when the page is not in the memory

   (b) when the page is in the memory

   (c) when the process enters the blocked state

   (d) when the process is in the ready state

8. Virtual memory is implemented by

   (a) demand paging

   (b) fragmentation

   (c) segmentation

   (d) None of the above

9. Disadvantage(s) of single level directory is/are

   (a) the confusion of file name between different users

   (b) the confusion of file data

   (c) searching will not be easy

   (d) All of the above

10. Solution of name collision problem is

(a) single level directory

(b) two level directory

(c) tree-structured directory

(d) None of the above

B. State whether the following statements are True *or* False : 1×5=5

1. Operating system is software.

2. A relative path name defines a path from the current directory.

3. Resource allocation graph is applicable for single resource system.

4. Virtual address space loads pages only as they are needed.

5. Priority scheduling is designed for time-sharing system.

SECTION—II

(*Marks* : 10)

C. Answer the following questions : 2×5=10

1. *(a)* Explain how multiprogramming increases the utilization of CPU.

OR

(b) Define personal computer operating system.

2. *(a)* What is thread? List the types of thread.

OR

(b) What is a semaphore? List the types of semaphores.

3. *(a)* What is a deadlock?

OR

(b) Explain deadlock prevention.

4. *(a)* Define paging.

OR

(b) Write the difference between Logical and Physical address.

5. *(a)* Write about the different types of file.

OR

(b) Define two-level directory.

(PART : B—DESCRIPTIVE)

(*Marks* : 50)

D. Answer the following questions : 10×5=50

1. *(a)* What is an operating system? Describe the functions of operating system.

OR

(b) Explain batch operating system and parallel processing operating system.

2. *(a)* Consider the following processes and the CPU Burst Time in milliseconds :

Process	*Burst Time*
P1	6
P2	8
P3	7
P4	3

(i) Draw the Gantt charts illustrating the execution of these processes using FCFS.

(ii) What is turnaround time and average waiting time? 10

OR

(b) (i) Define a process. With the help of a state transition diagram, explain the various states of a process. 6

(ii) What is a critical section problem? Give the conditions that a solution to the critical section problem must satisfy. 4

3. (a) Consider the following snapshot of a system. A system that contains five processes P0 through P4 and the three resource types A, B and C :

Process	*Allocation*			*Max*			*Available*		
	A	B	C	A	B	C	A	B	C
P0	0	1	0	7	5	3	3	3	2
P1	2	0	0	3	2	2			
P2	3	0	2	9	0	2			
P3	2	1	1	2	2	2			
P4	0	0	2	4	3	3			

Answer the following questions using the banker's algorithm :

(i) What are the contents of need matrix?

(ii) Is the system in safe state? If so give the safe sequence.

OR

(b) Discuss deadlock avoidance using resource allocation graph algorithm.

4. *(a)* Define swapping memory management. Explain the first fit, best fit and worst fit memory allocation techniques.

OR

(b) Explain the following page replacement algorithms in detail :

(i) Least recently used (LRU)

(ii) First in, first out (FIFO)

5. *(a)* What is access control list (ACL)? Discuss the Linked allocation and Indexed allocation.

OR

(b) What is file in operating system? Explain the different file attributes and file operations.

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